

Nuclear cardiology in the UK 1994: activity relative to Europe, USA, and British Cardiac Society targets

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Abstract

Objective—To survey practice in nuclear cardiology in the UK in 1994.

Design—A questionnaire was sent to 219 centres performing nuclear imaging asking for details of current practice in nuclear cardiology. Replies were received from 192 centres (88%).

Main outcome measures—Activity in performance of myocardial perfusion imaging (MPI) and radionuclide ventriculography (RNV), anticipated changes in activity, differences between regional and district hospitals, technical imaging parameters, and referral sources.

Results—Of the responding centres, 125 (65%) performed nuclear cardiology procedures. More regional than district hospitals performed nuclear cardiology procedures (85% *v* 55%, $p < 0.0003$) and regional centres performed a higher proportion (62% *v* 24%, $p < 0.001$) of nuclear cardiology activity. Nuclear cardiology activity was 0.82 scans per 1000 population per year (MPI 0.56, RNV 0.26). There has been a significant increase (24%) in nuclear cardiology since 1988. There has been a pronounced rise in MPI (350%) while RNV has fallen by 47%. Myocardial perfusion activity in the UK remains very low (25% and 5% in regional and district hospitals, respectively) compared with the 1994 figures of 2.2/1000/year for Europe or 10.8/1000/year for the USA.

Conclusions—MPI has increased on average by 23%/annum (compound rate) since 1988, but in 1994 was still only 32% of the British Cardiac Society target of 2.6/1000/year. Proper resources for capital expenditure on new equipment and new staff will be important to maintain momentum in closing the gap. Also important is improved clinical understanding, as already implemented by including nuclear cardiology in guidelines for specialist cardiology training.

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Keywords: survey; nuclear cardiology; myocardial perfusion imaging; radionuclide ventriculography; guidelines; British Cardiac Society

Nuclear cardiology is an important investigation for cardiovascular disease in the USA and much of mainland Europe.^{1 2} Previous surveys of nuclear cardiology suggest that utilisation of these techniques is lagging behind in the UK.³

This survey was conducted to ascertain the trends and changes in nuclear cardiology practice since 1988.³⁻⁶ In 1994, a survey was mailed to 219 nuclear medicine centres in the UK identified from radiopharmaceutical supply lists. A useful response was obtained from 192 centres (88%). These were categorised into district hospitals ($n = 130$), regional hospitals ($n = 54$), and private/military hospitals ($n = 8$).

Results

ACTIVITY

Overall, 125 centres in the UK (65% of centres responding) were performing nuclear cardiology procedures. Practice was more frequent in regional than in district hospitals (85% *v* 55%, $p < 0.0003$), and regional hospital activity represented a significantly higher proportion of total nuclear medicine workload (12% *v* 5%, $p < 0.001$). The total number of nuclear cardiology procedures in all centres was 39 929 (8.9% of total nuclear medicine workload). Assuming an equal proportion of workload among the non-responders to the survey, these figures suggest an annual total of 45 500 nuclear cardiology tests (0.82 scans per 1000 population per year).

For myocardial perfusion imaging (MPI), 27 445 procedures were reported (69% of total), and for radionuclide ventriculography (RNV), 12 484 (31%), of which 90% were performed at rest only. The adjusted total UK figures for these studies were 31 300 for MPI (0.56/1000/year) and 14 200 for RNV (0.26/1000/year). Each centre quoted their current trend for nuclear cardiology workload, and 71 replied that it was increasing, 31 static, and 10 indicated a view towards reducing. Ten district hospitals stated their intention to begin nuclear cardiology procedures in the near future.

Discussion

NUCLEAR CARDIOLOGY GROWTH

There has been considerable recent increase in the role of nuclear cardiology in the routine management of patients with cardiovascular diseases. This has been spearheaded in the USA where extensive training courses for cardiology fellows and large numbers of clinical validation studies have led to complete acceptance of the value of the techniques. While interest has been building in the UK, there has been a lag period, and there is no doubt that activity is a long way behind that of the USA and mainland Europe.

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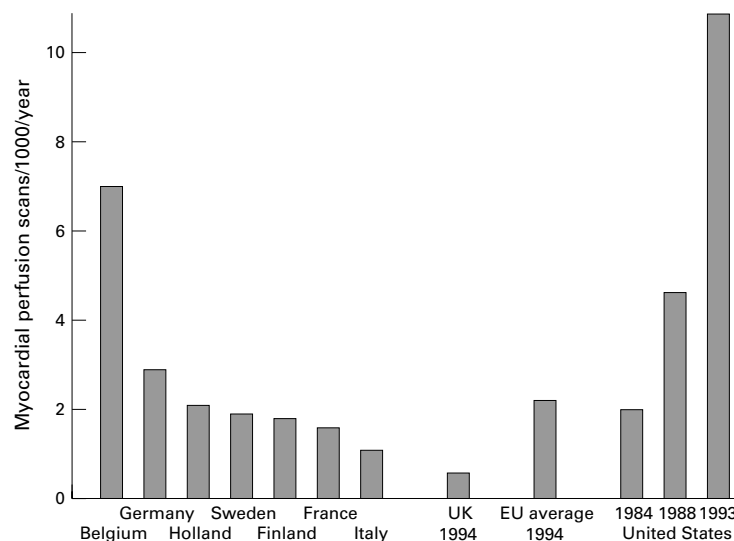


Figure 1 Comparison of the activity per head of population for MPI in developed European countries and the USA. The UK has the lowest activity at approximately one third the European average.

The most important finding of this study is the growth of nuclear cardiology that has occurred since 1988. After adjusting for the response rate and scope of previous surveys, the estimated number of nuclear cardiology procedures in 1988 and 1990 was 0.66 and 0.58/1000/year, respectively, which compares with 0.82/1000/year from our current survey. MPI has increased by a factor of 3.5 (0.16, 0.29, 0.56/1000/year) while RNV has fallen by 47% (0.49, 0.28, 0.26/1000/year). The anticipated increase in nuclear cardiology for the future reported from centres around the UK ties in well with the growth trend.

The increase in MPI has followed valuable clinical validation showing superiority of perfusion compared with other techniques for predicting future cardiac events,^{7,8} the robustness of the techniques to image even the most difficult patients using pharmacological stress,⁹ and the definition of myocardial hibernation.¹⁰ Clinical cardiologists also prefer the tomographic representation of images, which compare well with echocardiographic views,¹¹ and the switch from planar to tomographic imaging between 1988 and 1994 (22% to 78% of myocardial perfusion scans) has also played a part in improving popularity. The fall in RNV reflects the greater use of echocardiography for resting function.

The future

The crude annual estimate for the compound market growth since 1988 in myocardial perfusion imaging is 23% per annum. This figure accords with latest estimates for MPI in 1995, which is 38 000 (0.69/1000/year). European activity is rising at approximately 9% per year, which is lower than that in the UK, but overall activity is much higher than in the UK (in 1994, 2.2/1000/year). Thus, although we were performing only a quarter of European activity in 1994, we may have started to catch up. Comparisons with Europe and the USA,¹² show the UK at the lower end of activity for MPI among countries of similar economic

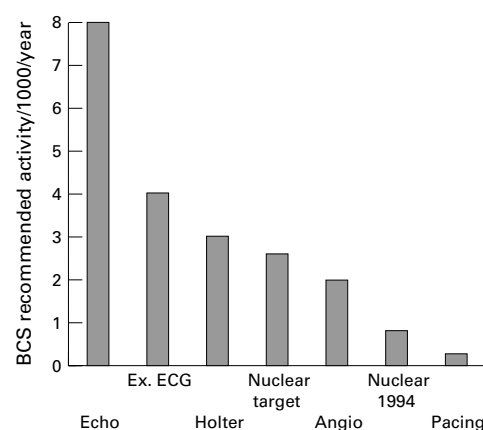


Figure 2 British Cardiac Society recommendations for activity in cardiology procedures and the activity in 1994.

status (fig 1). This situation is exacerbated by our high standardised mortality rates for coronary artery disease, which suggest that our rate for cardiovascular investigations should be higher than other countries. This has been recognised by the British Cardiac Society,¹³ and a target of raising our levels of nuclear cardiology activity (MPI 2.2/1000/year plus RNV 0.4/1000/year) towards European levels (total 2.6/1000/year in 1994) has been made in recent recommendations (fig 2).¹⁴ Thus for a district hospital with a catchment area of 250 000 people, a target of 550 myocardial perfusion scans per year (about 10 each week) would be appropriate. Specialist centres might wish to aim for up to three times average, perhaps 1500 patients per year (about 30 each week). From this survey, only 11 (22%) regional and one (1%) district general hospital met the target activity.

Clearly, an expansion of nuclear cardiology services has resource implications particularly for staff and capital expenditure required for the provision of modern tomographic scanners. For many centres, replacement or additional cameras are necessary if the target activity is to be realised. The cost of such equipment is similar to that of a top of the range echocardiography machine. At least progress has been made in the improvement of clinical understanding of the techniques with the publication of the training requirements for specialist registrars in cardiology in the UK, which now includes a compulsory period of training in nuclear cardiology,¹⁵ something that remains sadly missing from undergraduate curricula.

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IMAGES IN CARDIOLOGY

A calcified occlusion of the left main coronary artery in a young man



A 19 year old man was successfully resuscitated from ventricular fibrillation that occurred during exercise. Stress testing induced severe global ischaemia of the left ventricle. Coronary angiography (left) showed a normal right coronary artery (long arrow) that perfused the left coronary artery through peripheral collaterals (short arrows). At the site of the left main coronary artery, a dense radio-opaque mass was seen (curved arrow). On aortography, no antegrade flow of contrast through the mass into the left coronary artery could be seen (right, mass

indicated by arrow). At the age of 2 years the patient had been hospitalised for 6 months because of a severe febrile illness with a generalised rash, for which no diagnosis was established at the time. The findings on angiography combined with this history suggest Kawasaki disease. The left internal mammary artery was grafted to the left anterior descending artery, and the patient made a full recovery.

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